REMARKS

Claims 27-56 have been cancelled as being directed to a non-elected invention. Claims 1-26, 57 and 58 are pending.

Rejection under 35 U.S.C. §112 (second paragraph)

Claims 1-26 and 57-58 are rejected as being indefinite. In particular, the Examiner states that Claim 1 "recites 'method of making a fluorinated precursor' however the process steps (spraying solution and heating) would produce a fluorinated film not a precursor." (Office Action page 2, paragraph 2.)

Claim 1 recites a method of making a fluorinated precursor of a superconducting ceramic. The steps of the method include spraying a precursor solution (comprising salts of a rare earth, of an alkaline earth metal, and of copper) onto a substrate to provide a precursor-covered substrate. The precursor-covered substrate is then heated in an atmosphere containing fluorinated gas to form a fluorinated precursor. **After** the fluorinated precursor is formed, the conversion into a crystalline superconductor takes place. Conversion may involve heating the fluorinated precursor in the presence of water vapor and oxygen. See specification at page 14, lines 9-12, and dependent Claim 26.

To more clearly define the invention, Claim 1 has been amended to replace "film-covered substrate" with "precursor-covered substrate." Accordingly, this rejection is obviated.

First Rejection under 35 U.S.C. §103(a)

Claims 1-22, 24, 26, 57 and 58 are rejected under 35 U.S.C. §103(a) as being obvious over Gressler *et al.* (U.S. Patent No. 5,081,103) in combination with Chevalier *et al.* (U.S. Patent No. 5,132,281) and further in combination with EP-286,135. (See Office Action page 3, 2nd full paragraph, to page 4, 3rd full paragraph.)

The Examiner states that Gressler *et al.* teach "a fluorination of superconducting YBACUO powder with a fluorinated gas such as NF_2, NF_3, NF_3/O_2, etc." (See Office Action page 3, 2nd full paragraph.) The Examiner indicates that Gressler *et al.* is deficient in that they "fail to teach fluorinating a superconductive film as opposed to a superconducting powder." The Examiner states that Chevalier *et al.* teach "a process of making fluorine-stabilized superconducting materials. Fluorinating gas can be used to prepare a fluorinated material on a variety of materials such as powders, articles, layers, etc." The Examiner concludes that it would have been obvious for a skilled artisan to modify the Gressler *et al.* process "by fluoridating a superconductive film as opposed to a superconductive powder as evidenced by Chevalier *et al.* with the expectation of achieving similar success regardless the 'form' of the superconducting material being fluorinated."

Applicants respectfully disagree with the Examiner's analysis. Gressler *et al.* and Chevalier *et al.* describe methods and products which are fundamentally different from the methods and products of the present invention, as discussed below.

The present invention includes a method of making fluorinated precursors of superconducting ceramics. The steps of the method include spraying a precursor solution onto a substrate to provide a precursor-covered substrate. The precursor-covered substrate is then fluorinated by heating in an atmosphere containing fluorinated gas. "The temperature to which the atmosphere is heated is in the range of about 300° C to about 900° C." (See specification page 12, lines 12-13.) A fluorinated precursor is formed.

After formation of the fluorinated precursor, the precursor of the present invention is converted into a crystalline superconductor by annealing. (See specification page 14, lines 9-12 and Claim 26.) Fluorine in the precursor enhances epitaxial growth during the conversion. (See specification page 15, lines 25-26.) The crystalline superconductor formed by the present invention contains only trace amounts of fluorine.

On the other hand, Gressler *et al.* teach a method of structurally incorporating fluorine into the $YBa_2Cu_3O_{7-x}$ crystalline structure. (See col. 2, lines 64-66.) In particular, fluorine is incorporated "primarily onto the oxygen vacancies at the O(5) sites or perhaps to some extent at the O(4) sites on the CuO chains. The addition of fluorine reduces the lattice strain making it more 'orthorhombic.'" (See col. 3, lines 32-38.) The end-product has fluorine incorporated into the $YBa_2Cu_3O_{7-x}$ structure to form $YBa_2Cu_3O_{7-x}F_y$, wherein y can be up to 0.68. (See col. 4, line 1.)

In the Gressler *et al.* method, oxygen-deficient $YBa_2Cu_3O_{7-x}$ crystalline powder is fluorinated by annealing the crystalline powder in the presence of a fluorine containing gas (col. 2, lines 48-66, and Claim 1). The form of fluorine used is ClF_3, NF_3, HF, PF_5 and mixtures

thereof (Claim 1). Figure 2 of Gressler *et al.* shows the X-ray diffraction pattern of the superconducting crystalline powder before fluorine-treatment and after treatment.

Similar to Gressler *et al.*, Chevalier *et al.* teach a method of incorporating fluorine into the structure of superconducting materials. However, in the Chevalier *et al.* method, "The fluorine atoms are distributed for the most part in the external layer of such materials." (See col. 4, lines 60-61.)

In the Chevalier *et al.* method, a superconducting material is fluorinated "at a temperature not exceeding 120°C...more preferably, ...at ambient temperatures, *i.e.*, at 20°C." (See col. 4, lines 36-41, and Claim 1). In fact, Chevalier *et al.*, emphasize that "[t]his temperature limitation is extremely important..." (See col. 4, line 43.) The form of fluorine used is F_2, NF_3, HF, tetrafluoromethane, halogen fluorides, rare gas fluorides, and BF_3. (See col. 4, lines 1-5.)

Accordingly, the method and product of the present invention are completely different from those disclosed by Gressler *et al.* and Chevalier *et al.* In particular, in the present invention, precursor materials are fluorinated; whereas, in the cited references, superconducting materials are fluorinated.

Also, in contrast to Gressler *et al.* and Chevalier *et al.*, in the present invention, fluorine is **not** incorporated into the structure of a superconducting material. Instead, the crystalline superconductors "contain only **trace amounts of fluorine**." (See specification page 14, lines 22-23.)

Moreover, the fluorinated gases used in the present invention are not disclosed in the cited references. The fluorinated gas used in the present invention includes CHF_3, CH_2F_2, CH_3F,

CHF_2CHF_2 (HFC 134), CHF_2CF_3 (HFC 125), CHF_2CH_3 (HFC 152a), CF_3CH_2F (HFC 134a), CH_3CF_3, CH_2FCH_3, CHF_2CH_2F, CH_2FCH_2F, $CF_3CH_2CF_3$ (HFC 236fa), a fluorinated propane, a fluorinated propylene, a fluorinated ethylene and mixtures thereof. (See Claim 20.)

The Examiner states that Gressler *et al.* and Chevalier *et al.* fail to teach spraying the superconductive material on a substrate. The Examiner cites EP-286,135 for teaching flame spraying ceramic oxide superconductors (Office Action paragraph bridging pages 3 and 4). As discussed above, the methods and products of the present invention are fundamentally different than those of the cited references. The further teaching of flame spraying does not remedy the deficiencies in the primary references.

Accordingly, Applicants respectfully request that the obviousness rejection be withdrawn.

Second Rejection under 35 U.S.C. §103(a)

Claims 23 and 25 are rejected under 35 U.S.C. §103(a) as being obvious over Gressler *et al.* in combination with Chevalier *et al.*, further in combination with EP-286,135, still further in combination with Ovshinsky *et al.* (U.S.P.N. 5, 132,281) or JP 01-83651. (See Office Action page 4, penultimate paragraph.)

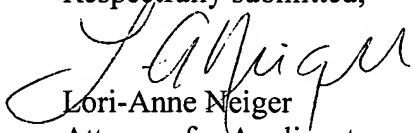
The Examiner states that Gressler *et al.* in combination with Chevalier *et al.* further in combination with EP-286,135 "fail to teach a plasma discharge for forming the superconducting material." (See Office Action page 4, last paragraph.) The Examiner further indicates that Ovshinsky *et al.* and JP 01-83651 teach glow discharge plasma and plasma discharge, respectively. (See Office Action page 5, 1st two paragraphs.)

As discussed above, unlike the present invention, both of the primary references teach *i*) incorporation of fluorine into the atomic structure of superconducting materials, and *ii*) fluorinating a crystalline superconducting material. Whereas, the products of the present invention do not have fluorine incorporated into the atomic structure of superconducting materials, and the methods of the present invention require fluorinating a precursor material (*i.e.*, not a crystalline superconducting material). The teaching of flame spraying, and the further teaching of plasma discharge, do not remedy the deficiencies in the primary references.

Accordingly, Applicants respectfully request that the obviousness rejection be withdrawn.

Applicants respectfully submit that the application is now in condition for allowance, which action is earnestly solicited. If resolution of any remaining issue is required prior to allowance of this application, it is respectfully requested that the Examiner contact Applicants' undersigned attorney at the telephone number provided below.

Respectfully submitted,



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